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Nursing student's perceptions on how immersive simulation promotes theory–practice integration

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ABSTRACT

The inability of nurses to transfer to the clinical setting what they have learned in class, may be because nurse educators do not use teaching strategies that promote transfer of learning. Unfortunately there is paucity of evidence as to which teaching strategies promote transfer of learning. Based on a qualitative descriptive study, this article attempts to answer the question about how simulation helps students to apply in practice what they have learned in class. Open coding of the data that were gathered through two focus group interviews and documents revealed that simulation promotes theory–practice integration, builds confidence, makes students aware of the aspects of care that need to be improved through deliberate practice, increases the motivation to learn and transfer their knowledge, and strengthens communication among team members. Knowledge on the benefits of simulation can guide nurse educators to harness the method to enhance transfer of learning.

1. Introduction

Failure to rescue and, consequently, the dire patient outcome of death, may be due to the inability of nurses to transfer what they have learned in class to the clinical setting. Nursing students should be able to transfer their theoretical knowledge during clinical practicum whilst they are in training because health services expect nurses exiting a training programme to be competent at the entry level (Allan, Smith, & O'Driscoll, 2011). Hence, it is the aim of all nurse educators to promote transfer of learning, which is the ability to access and utilize one's intellectual resources in situations where these may be needed (Lauder, Sharkey, & Booth, 2004). The nurse is expected to generalize the concepts learned in all courses and apply them to real-life work situations beyond the training context and maintain this behaviour over a long period of time (Holton, Bates, Bookter, & Yamkovenko, 2007). In order to achieve this, the student nurse should take control of new information and internalize it to transform existing knowledge and create new knowledge (Levin, 2010).

Transfer of learning is a complex, systemic process that is influenced by multiple factors (Kirwan & Birchall, 2006) for example the educational design, work environment and the transfer climate which influence the student's capacity to perform in the workplace. In the workplace, the student's performance with regard to transfer of learning is influenced by his or her inherent ability and motivation to learn and to apply newly constructed knowledge. Performance is often classified as 'competent' or not 'yet competent'.

Characteristics of a competent nurse include the ability to think critically and to reason clinically in order to make sound clinical judgments. Sound clinical judgment is thus the logical outcome of critical thinking and clinical reasoning. Critical thinking comprises the ability to integrate knowledge from all disciplines in order to identify the problem, understand the theory related to the problem, and predict the progression of the problem and consequences of the treatment or omission of treatment. Critical thinking activities include defining the problem, judging the credibility of the information, making accurate inferences and making reasonable value judgments (Chang, Chang, Kuo, Yang, & Chou, 2011). Clinical reasoning is a more advanced step than critical thinking because it includes the considerations of the unique features of the patient in a specific context. After taking all sociophysiological aspects into consideration, the nurse should be able to make a decision to the advantage of the patient in a limited time (Chang et al., 2011; Tanner, 2006) thus demonstrating competence.

Competence in nursing comprises a complex and elusive skill set that poses a challenge for nurse educators (Weatherspoon & Wyatt, 2012) since there is little evidence as to which teaching methods ensure attainment of all the required skill mix.

Teaching methods that promote critical thinking and clinical reasoning have been described but very few researchers could demonstrate that the teaching method enhanced clinical

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judgment. Sobhani et al. (2012) found that cooperative strategies resulted in increased transferring abilities with regard to clinical workup and treatment in medical students. According to Malesela (2009), case studies, as a learning opportunity, increase critical thinking skills and theory–practice integration. Similarly, McCormick, De Slavy, and Fuller (2013) found that unfolding case simulation promotes critical thinking. Yuan, Williams, and Fan (2008) conclude in their systematic review that there is insufficient evidence to claim that problem-based learning develops nursing students' critical thinking. However, there is scant evidence that high fidelity simulation may be a teaching and learning method that supports students in developing the skill to make sound clinical judgment (Dayal et al., 2009; Lindsey & Jenkins, 2013; Steadman et al., 2006) but none described how students perceived simulation to assist them with transferring their learning.

Since the author is affiliated with a nursing school that started with immersive simulation in 2010, the question as to how simulation contributes to transfer of learning arose. Understanding the mechanisms of how simulation cultivates transfer of learning may encourage educators to use simulation more frequently as a teaching and learning technique.

2. Methodology

This article reports on a qualitative descriptive study that explored and described how students perceived simulation to contribute to their ability to transfer learning. In the nursing school where the research was conducted, simulation is seen as a learning opportunity which builds on the learning theory of constructivism. Simulation is thus seen as an opportunity to enhance higher-order thinking and critical problem solving. In addition to performing appropriate psychomotor tasks, students are encouraged to explain why they take certain actions during the simulation which "forces" them to learn conceptually (Kaakinen & Arwood, 2009).

2.1. Unit of analysis

After the faculty ethics review board had approved the research proposal and the head of the nursing school had given permission that the students may participate, third- and fourth-year nursing students were recruited to participate in the focus group interviews. Simulation as a learning opportunity is used throughout the 4 year programme. Standardized patients (people trained to act as patients) are primarily used during the first 2 years. High fidelity human simulators are used more often than standardized patients during the third year. In the fourth year of study an equal number of simulations with standardized patients and human simulators are run. Third and fourth year students were recruited because the likelihood that they have encountered in clinical practice situations similar to what they have experienced in simulation is bigger. The inclusion criterion was that the students should have actively participated in an immersive simulation. Immersive simulations engage students psychologically when they perceive the representation as believable and true to reality. The level of the psychological engagement links with how the student engages and experiences the simulation (Paige & Morin, 2013). Immersive simulations are achieved with standardized patients as well as high-fidelity patient simulators. Each of the two focus groups had four participants who volunteered, thus representing convenient sampling. One participant in each group was a male. Participation was voluntary, and neither the researcher nor the facilitator taught any of their courses; thereby reducing the possibility of power coercion.

2.2. Data gathering and data analysis

The facilitator of the focus groups is a child psychiatric nurse clinician with many years' interviewing experience and is a reputable qualitative researcher. After she had explained the purpose of the research and requested the participants to maintain confidentiality, she asked them to complete the consent form. Participants also gave permission that the discussion may be audio taped. The facilitator's request to the participants was, "Please tell me [facilitator] how simulation helps you to apply in practice what you have learned in class." This question was also added to the standard evaluation form that students had to complete immediately after they had participated in an immersive simulation experience with a standardized patient.

From the onset it was clear that the students understood the request and therefore no exploratory interview was needed. During the focus group interview, the facilitator used silence, questioning, validation and other appropriate communication techniques to maintain the flow of the discourse.

The author transcribed the audio tapes on the day the interviews were conducted, and the facilitator reviewed the transcriptions for truthfulness the following day. Thirty-three fourth-year nursing students had an immersive simulation learning opportunity with a standardized patient during the week and the data were gathered. As the question that was asked during the focus group interviews had already been added to the standard evaluation form, the data captured by that specific question was analysed together with the data from the focus groups. Thus, method triangulation enhanced the trustworthiness of the results. Data saturation was attained as no new information emerged from the evaluation forms. Open coding of the data was done independently by a co-coder. The co-coder and the author reached consensus on the themes identified.

2.3. Trustworthiness

Trustworthiness of the results was enhanced through method triangulation. Two unstructured methods, namely focus group interviews and documents, were used to collect data on the same phenomenon (Pollit & Beck, 2008). Furthermore, the credibility of the facilitator raised the trustworthiness of the results. Dependability was heightened by the supporting and contrasting literature corroboration in the discussion of the results. An independent co-coder arrived at the same themes as the author, which further confirmed the truthfulness of the data. The dense description of the process and results allow for transferability (Pollit & Beck, 2008).

3. Findings

All the participants of the focus group interviews had a minimum of three immersive simulations with standardized patients. Of the eight focus group participants, two had not participated in simulation with a high-fidelity simulator before but all of them had observed a minimum of three high-fidelity immersive simulations. The eight participants also stated that they all had encountered a patient in clinical practice that was similar to one of the simulated scenarios. These experiences reflected the authenticity of the simulations they were exposed to.

Two participants favoured the standardized patient as the type of immersive simulation from which they have learned most. Another two preferred simulation with the high-fidelity simulator whilst the other four participants said that they learned from both types of simulation and that each type had its purpose and place. Participants also commented that they learned as much from

observing the simulation as from those actively participating in the simulation.

Five themes were identified from the combined data, namely theory–practice integration, confidence, deliberate practice, motivation, and teamwork. Table 1 reflects some of the responses categorized per theme and the number of responses per theme. The small number of responses under 'teamwork' may be due to the fact that the students had more exposure to standardized patients, which is a one-to-one experience than to simulation with high-fidelity simulators where they intervene as a team.

4. Discussion

The responses under the theme 'theory–practice integration' explicitly demonstrate that transfer of learning occurs because students can apply their knowledge and skills from training in the simulated work setting (Hutchins, Burke, & Berthelsen, 2010). Leigh (2008) describes simulation as the vehicle for translating classroom knowledge into a safe "clinical" learning environment. The following quotes illustrate that participants could transfer their classroom knowledge from disciplines other than nursing, for example psychology and microbiology.

> Realized that [this] course is where theory from each module from 1st-year up to today is integrated to treat specific person – not only nursing subjects but from ALL modules – psychology, microbiology ...
>
> Get to see why you have to do all the modules – I realized the relevance of each module and that it is not a waste of time to study them. Actually those modules are really important to understand what nursing is all about.

Although various researchers have demonstrated that simulation does not necessarily increase students' ability to think critically (Fero et al., 2010), participants in this study being reported here mentioned that they were enabled to think critically. Jeffries (2005) confirms that simulation affords students the opportunity to make connections between concepts through their active engagement in the learning process. Contrary to Fero et al. (2010), Rush, Dyches, Waldrop, and Davis (2008) claim that simulation used by distance delivery cultivates critical thinking. Lapkin, Levett-Jones, Bellchambers, and Fernandez (2010) support Rush et al. (2008) by concluding their systematic review with the statement that immersive simulation improves knowledge acquisition and critical thinking.

Participants voiced that they were able to apply their "current knowledge" in the situation and were able to calm family members by explaining the situation to them. However, the researcher is uncertain whether these statements refer to the simulation or the real clinical practice. A valuable insight from the current study is that the students mentioned that knowledge is retained for longer after practical application of such knowledge. These statements confirm that theory–practice integration is practiced during simulation and allude to the possibility that students are able to transfer their classroom learning to practice.

Increased confidence, the second theme, is confirmed by the following statements:

> Know what you are supposed to do when you encounter a similar situation in the clinical setting
>
> Feel more at ease because it is not the first time you see a patient with the condition...
>
> Adapt easier to the clinical practice – I sort of know what is expected of me

Students in the study conducted by Fero et al. (2010), just as the participants in the current study, perceived that simulation increased their ability to practice in the real world, in other words, use their theoretical knowledge in clinical practice. This finding supports a statement by Beyea, Von Reyn, and Slattery (2007, p. 77), namely "simulation serves as a highly effective strategy for developing competency, confidence and readiness for entry-into-

Table 1
Number of responses and examples of responses per theme.

Theme	No. of responses	Selected examples of responses
Theory–practice integration	18	• Not only skill but have to think about other things as well, e.g. safety of staff, patient • How to calm the family members and how to explain what is going on • Enable students to think critically and apply current knowledge • Bring theory into practice • Practical application helps you to retain the knowledge longer
Confidence	16	• Know what you are supposed to do • Prepare for similar situations • Learn from mistakes – will never forget that day • It is not that you do not have any idea what to do when you enter clinical practice • More in control – therefore able to be more flexible • Adapt easier to the clinical practice • Decrease anxiety in practice
Deliberate practice	10	• When you do something regularly it grows on you and you learn (sic) to think systematically and logically – you know what to do and do not run around • Could implement what I have learnt but still need more experience/practice • Could see my weaknesses and strengths – practice more • Could improve on previous performance • Feedback was valuable – know what needs to be improved
Motivation	10	• Scary at first but get to enjoy it • Want to do it again because you know what to do – appreciate opportunity to do again • You feel like a professional • In practice, the memory of this will help me to focus on changing what I did wrong previously and improve on my strong points • Value the feedback of other students and discussion during debriefing – very valuable
Teamwork	5	• Need my colleagues – I cannot do everything by myself • Need to communicate effectively with the group • Realized the value of other people and other professions in the health care team

practice". Norman (2012) concurs with Beyea et al. that simulation creates a learning environment that promotes knowledge, skills, safety and confidence.

Issenberg, McGaghie, Petrusa, Lee Gordon, and Scalese (2005) found that slightly more than a third of the journal articles they studied described repetitive practice as a key element of simulation in health education. Deliberate practice has a slightly different nuance than repetitive practice in the sense that it refers to intentional efforts to improve one's performance beyond its current level (Clapper & Kardong-Edgren, 2012; Duvivier et al., 2011). The responses from the participants in the current research therefore resonated with deliberate practice because they reasoned they "Could improve on previous performance" and "... feedback was valuable – know what needs to be improved". These statements reflect the viewpoint of Duvivier et al. (2011) on deliberate practice, namely that it is a sustained practice to address weaknesses that are identified through self-assessment and are stimulated by feedback.

The fourth theme that was identified was 'motivation', which is an essential component in the systemic model of transfer of learning. A prerequisite for transfer of learning to occur is that students should be motivated to learn and that they should be eager to apply their knowledge in the workplace (Gegenfurtner, Festner, Gallenberger, Lehtinen, & Gruber, 2009). The fact that students enjoy the learning experience contributes to the motivation to transfer. This is confirmed by Gegenfurtner et al. (2009) who found that attitudes towards training content were positively related to autonomous motives to transfer learning. Motivation to learn and to transfer classroom knowledge is strengthened when students encounter patients in the clinical practice with conditions similar to those portrayed in simulation (Holton et al., 2007). All the participants of the focus group interviews indicated that they had seen patients with similar conditions during their work-integrated learning and could make the link between the learning activity and the real world task. Ford (2009) is of the opinion that educators should explain and make the link between the learning activity and real world tasks for students but through simulation the students experience the "real world" and could make their own links. Students thus realized the "usefulness" of training which is closely associated with transfer of learning (Ruona, Leimbach, Holton, & Bates, 2002).

Students realizing the importance of other subjects being studied in the nursing programme confirmed the relevance of the content. In addition to relevant content, simulation actively engages students in the learning process and therefore meets another educational design criterion for transfer of learning (Gegenfurtner et al., 2009).

The low number of responses with regard to teamwork could have resulted from the participants having had more exposure to simulated patients than to the high-fidelity simulators. The one-to-one interaction with the standardized patient emphasizes interpersonal communication whereas with the high-fidelity simulator, the students engage as a team with the patient (simulator) and the emphasis shifts to inter-professional communication and teamwork. Even though the responses were limited, the key elements of inter-professional training programmes were highlighted, for example:

> Need my colleagues – I cannot do everything by myself

> Need to communicate effectively with the group – it is chaos when we do not communicate and everyone is doing her own thing

According to Olenick and Allen (2013), poor inter-professional communication affects patient outcomes negatively. The fact that the participating students realized the importance of effective communication within a team is the first step towards a solution.

5. Conclusion

Qualitative data were collected through two focus group interviews and standard evaluation forms. The open-ended question on the form was the same as the one asked during the focus group interviews. Open coding of the data revealed five themes, namely theory–practice integration, confidence, deliberate practice, motivation, and teamwork. The researcher and co-coder derived the same themes. In addition to using the co-coder, other strategies such as using a reputable qualitative researcher as focus group facilitator and using method triangulation were implemented to enhance trustworthiness.

The participating students perceived simulation to be a tool that bridges the theory–practice gap. They mentioned that they could apply their theoretical knowledge; thus, transfer of learning occurred. The fact that they could apply theoretical knowledge from disciplines outside nursing, for example microbiology and pharmacology, confirmed that critical thinking occurred. Confidence to participate in rendering care to patients during work-integrated learning increased because the participants felt they knew what to expect and what was expected from them. During the debriefing sessions, students identified their own strengths and weaknesses and could plan on how to improve their skills. Feedback from the group also stimulated the need for deliberate practice.

Experiencing an immersive simulation learning opportunity is a strong motivator to learn and to apply in practice what has been learnt in the classroom. This motivation to learn and apply is a critical element of the systemic model of transfer of learning. It is therefore equally important in the educational design factor because it highlights the relevance of the content in the spectrum of courses that is incorporated into a nursing degree programme. Furthermore, immersive simulation forces students to actively engage with the learning material which, according to the respondents of this study, supports the retention of knowledge. Even though there were few responses with regard to teamwork, the participants clearly realized the importance of accurate and clear communication among team members.

The limitation of the study is the disparity between the number of simulations with standardized patients and those with the high-fidelity simulators to which the participants were exposed. This disproportion may have contributed to the few responses regarding teamwork. Another limitation is that the findings cannot be generalized due to the specific context within which the research was conducted. However, due to the dense description, readers may be able to relate the findings to their situation and decide for themselves whether it is applicable in their context.

Due to the inconsistencies in defining and measuring critical thinking and clinical reasoning within the nursing discipline, I recommend that replicable studies be done that are comparable. Standardized tools that measure clinical judgment ability in the clinical setting should be developed. Once these tools are validated nursing education institutions should collaborate to determine if immersive simulation promotes theory–practice integration in the clinical setting. The skills of critical thinking, clinical reasoning, and the ability to make sound clinical judgment are crucial for all nurses especially those in countries where the nurses are the heartbeat of the healthcare delivery system. Transfer of learning has been demonstrated at the halfway stop between classroom and clinical practice (simulation) but it still needs to be assessed in the real clinical practice.

Immersive simulation should be a key element in the design of nursing programmes because simulation serves as a strong motivator to learn and apply knowledge and skills. There is no real preference for either standardized patients or high-fidelity patient

simulators as long as each simulated learning experience is relevant to the topic the students are studying, authentic, and that it engages the students emotionally and at a high cognitive level.

Conflict of interest

None.

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